3 x 4 SWITCH PLUS

3x4 Switch Plus Controller
and
1x4 ANTENNA SWITCH

OPERATING MANUAL
TABLE OF CONTENTS

Introduction........................................................................................................3

3x4 Switch Plus Controller front panel controls......4-5

3x4 Switch Plus Controller rear panel controls .......6-11

1x4 Antenna Switch .........................................................................................12-13

3x4 Switch Plus configurations .................................................................14-18

3x4 Switch Plus Quick Start .................................................................19-28

DECEMBER 2011

W2IHY TECHNOLOGIES

Julius D. Jones
19 Vanessa Lane
Staatsburg, N.Y. (12580)
(845) 889-4253
E-mail: Julius@W2IHY.COM
Home Page: http:// www.w2ihy.com
© 2011 W2IHY, ALL RIGHTS RESERVED
INTRODUCTION

3x4 Switch Plus by W2IHY

You asked for it, we listened, and here it is! The 3x4 Switch Plus coax switch from W2IHY. W2IHY Technologies has made it a priority to develop products for the amateur radio community that not only make your operating experience more enjoyable but also are easy to use. If you own more than 1 radio that share the same antennas, external amplifier(s), antenna tuner(s) or other devices connecting a particular radio to one on several antennas or other devices can be a complex and stress filled experience. In some cases if a switch is turned incorrectly or a piece of coax is connected into the wrong place one or more pieces of equipment may even be damaged. The 3x4 Switch Plus coax switch was designed by W2IHY to make connecting multiple radios to shared external amplifiers, tuners and other gear more simplistic. Switching from one radio to another radio is as easy as turning a single knob. Configuring the system is done by turning rotary switches. There are no computer controlled menus to configure. If you are looking for an easy way to switch from one radio to another then the 3x4 Switch Plus coax switch is for you.

The 3x4 Switch Plus is built using a rugged steel chassis with easy to use front panel controls and clearly marked rear-panel connections. We feel so confident that you will be delighted with the 3x4 Switch Plus that we offer a 30 day money back, no questions asked guarantee. The Switch represents the new reference point for easy to use amateur radio audio equipment.
(1) **POWER ON/OFF SWITCH**
This switch turns the unit’s power on and off. The yellow LED will illuminate when power is present in the unit.

(2) **TUNE SWITCH**
This switch disables all three (opens 3 amp keying relays), rear accessible, output Amp Keying RCA connectors. (See page 10 ). The Red LED will illuminate whenever the output amplifier Keying RCA connectors are disabled.

(3) **LOCAL/REMOTE INPUT SELECT SWITCH AND LEDS**
This 4 position rotary switch is used to connect one of up to three radios from the Input A,B,C connectors to the coax, ALC, amp keying and speaker output connectors. When this switch is turned to select “A” the radio that is connected into RF input A will be connected to the 3 x 1 output. The green RF input A LED will illuminate. When this switch is turned to select “B” the radio that is connected into RF input B will be connected to the 3 x 1 output. The green RF input B LED will illuminate. When this switch is turned to select “C” the radio that is connected into RF input C will be connected to the 3 x 1 output. The green RF Input C LED will illuminate. When this switch is turned to Remote the radio that is connected to the 3 x 1 output is determined by the rear panel Input Select 5 pin DIN or Input Select RCA connectors (see pages 7 and 9). The appropriate green LED will illuminate.
(4) RF OUTPUT SWITCHES
These switches direct coax (RF) inputs A, B and C to the output of the 3 x 1 Controller / Switch. When a 1X4 Antenna Switch (See page 12) is connected to the coax output of the 3 X 1 Controller / Switch the input of the 1X 4 Antenna Switch is connected to one of 4 outputs of the 1 x 4 Antenna Switch based on these switch positions.

(5) AUX SWITCH
When the AUX switch is turned on, the coax input of the 1X 4 Antenna Switch is connected to the AUXillary coax output of the switch. The AUX green LED, on the 3 x 1 Controller will illuminate when the AUX switch is on.

(6) RF OUTPUT LEDS
When the 1 X 4 Antenna Switch is connected to the 3 X 1 Controller (via a DIN to DIN cable), these LEDs indicate which 1X 4 Switch RF Output is being selected. The 1 X 4 Switch also has LEDs on it that indicate which output is being selected. The position of the Local / Remote Select Switch (see page 4), the Coax Output Switches (see page 5) and Aux Switch determine which 3 x 1 Controller input is connected to which 1 X 4 Antenna Switch output.
(7) GROUND CONNECTOR
Station ground should be connected here.

(8) COAX RF INPUTS
These three coax inputs are used to connect RF devices such as transceivers or RF linear amplifiers to the 3 x 1 Controller / Switch. The front panel mounted Local / Remote Input Switch is used to select which one of the three RF inputs is connected to the 3 x 1 RF Output.

(9) 3 X 1 COAX RF OUTPUT
This coax output is connected to one of three coax inputs (see text above). Which input is connected to the output is determined by the position of the front panel mounted Local / Remote Input Switch.

(10) POWER IN
This 6 pin DIN Connector is used to provide DC power to the unit. Power requirements are 10 to 15 VDC at 1 AMP for Powering one Controller and one 1 X 4 Antenna Switch. The power required for two Controllers and two 1 x 4 Antenna switches is 10 to 15VDC at 2 AMPs.

Power
6 Pin Male DIN
Din connectors shown on side to be soldered

-6-

GND

+ 10 to 15VDC
**3 x 1 CONTROLLER/SWITCH**

**REAR PANEL CONTROLS**

(11) **INPUT SELECT**
This 5 Pin DIN is used when the Local / Remote Input Select Switch is in the remote position. It allows the selection of the A, B, C coax inputs to be selected remotely. When the Local / Remote Input Select Switch is in the Remote position this 5 PIN DIN is active (see page 4). The following picture and table describe the function of the connector.

**Connector active when Local / Remote Input select is turned to Remote**

<table>
<thead>
<tr>
<th>5 Pin DIN Grounded</th>
<th>Input Coax Connector Connected to Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Selected</td>
<td>OPEN: A, B or C not to output</td>
</tr>
<tr>
<td>A</td>
<td>A to Output</td>
</tr>
<tr>
<td>B</td>
<td>B to Output</td>
</tr>
<tr>
<td>C</td>
<td>C to Output</td>
</tr>
</tbody>
</table>

Din connectors shown on side to be soldered

(12) **OUT TO 1 X 4 SELECT**
This 5 Pin DIN is connected to the 1 X 4 Switch 5 pin DIN (See Figure 12). This connection switches the coax input of the 1 X 4 Switch, to one of the 4 coax outputs. Below is a picture of the cable wiring.

Din connectors shown on side to be soldered

Shield and Black wire
13) **POWER OUT**

This 6 pin DIN connector is used to provide DC power to another 3 X 1 Controller / switcher and 1 X 4 Switch. To provide power for a second Controller and second 1 X 4 Switch a cable must be connected from the Power Out of the 3 x 1 controller providing power to the Power In of the controller requiring power. Below is a picture of how the cable must be wired.

**Power Out to Power In Cable**

- Power
- 6 Pin Male DIN
- Din connectors shown on side to be soldered
- GND (Shield)

+ 10 to 15VDC

14) **OUTPUT SELECT**

This 5 Pin DIN is used to identify which of the 3 coax outputs (1, 2 or 3) on the 1 X 4 Switch is active. This DIN output can be connected to Input Select of a second switch when adding an additional level of switching is required. Below is a picture defining the pins on this 5 Pin DIN connector.

- Select Output 1
- Select Output 2
- Select Output 3

GND

Note: Select 1 Output goes to Select A input. Select 2 Output goes to Select B Input. Select 3 goes to Select C Input
INPUT SELECT

These RCA connectors are used to remotely replace the function of the Local / Remote Select Switch. These RCA connectors are active when the Local / Remote Input Select Switch is in the Remote position (See page 4). The internal circuitry in the controller only allows a single coax input to be connected to the coax output even when multiple RCA Input Selects are grounded. The following table describes the function of these RCA connectors.

<table>
<thead>
<tr>
<th>5 Pin DIN Grounded</th>
<th>Input Coax Connector Connected to Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Selected</td>
<td>OPEN: A, B or C not to output</td>
</tr>
<tr>
<td>A</td>
<td>A to Output</td>
</tr>
<tr>
<td>B</td>
<td>B to Output</td>
</tr>
<tr>
<td>C</td>
<td>C to Output</td>
</tr>
</tbody>
</table>

SPEAKER AUDIO

These RCA inputs accept mono or stereo inputs from up to 3 radios or other sources. The 3 x 4 Controller will send one of the three speaker (RCA stereo) inputs to the speaker (RCA Stereo) output. The RCA speaker output may be connected to a single mono or stereo speaker system or recording device.
Linear Amplifier Keying

These (RCA) amplifier keying inputs accept linear amplifier keying connections from up to 3 radios. The output amplifier keying connectors support keying up to 3 amplifiers. Each 3 X 1 Controller amplifier keying outputs is connected to an internal controller relay contact. The specific output amplifier (RCA) keying contact that is closed is associated with the RF output that is being selected by the front panel output select switches. (see page 5).

The following is an example of how the amplifier keying works. When RF Output 3 is being selected, on the 3 X 1 controller, the green LED for output 3 will be on. If RF Output 1 is selected then Output AMP Keying Output 1 will be shorted. If RF Output 2 is selected then Output AMP Keying Output 2 will be shorted. If RF Output 3 is selected then Output AMP Keying Output 3 will be shorted.

ALC CONTROL

These RCA connectors are used to connect ALC function between amplifiers and radios.

The radio connected to Input A should connect its ALC input into (RCA) ALC input A. The radio connected to Input B should connect its ALC input into (RCA) ALC input B. The radio connected to Input C should connect its ALC input into (RCA) ALC input C. The amplifier connected to 1 X 4 Antenna Switch Output 1 should connect its ALC to (RCA) Output ALC 1. The amplifier connected to 1 X 4 Antenna Switch Output 2 should connect its ALC output to (RCA) Output ALC 2. The amplifier connected to 1 X 4 Antenna Switch Output 3 should connect its ALC output to (RCA) Output ALC 3. Which one of three RCA ALC outputs a given ALC input is connected is associated with the RF output that is being selected by the front panel RF Output select switches. (see page 5).
Amplifier Key Line

These RCA connectors are used to disable all three (opens 3 amp keying relays), rear accessible, output Amp Keying RCA connectors. (See page 10). The Red LED, above the front panel tune switch will illuminate whenever the output amplifier Keying RCA connectors are disabled. When the SWR Out RCA connector is not shorted all 3 output Amp keying RCA connectors will be disabled. Devices like a SWR meter, which has circuitry to disable linear amplifier keying, would connect here. The SWR IN RCA must be connected to the SWR Out RCA if no external device is connected to disable amplifier keying.
**1 X 4 ANTENNA SWITCH**

(15) **GROUND CONNECTOR**
Station ground should be connected to this connector. Grounding this point grounds any of the four coax connectors that are not connected to the Input coax connector.

(16) **INPUT COAX RF CONNECTOR**
This Input Coax RF Connector may be connected to one of 4 Output Coax RF Connectors. Connection of the Input to the output is done using the control 5 Pin DIN connection (see page 13). This unit is capable of easily handling 10,000 watts PEP of RF.

(17) **OUTPUT COAX CONNECTORS**
These 4 coax RF connectors are used to connect antennas or other external devices to the Input Coax RF Connector. Switching the input connector to one of 4 Output connectors is done using the control 5 Pin DIN connection (see page 13). This unit is capable of easily handling 10,000 watts PEP of RF.
1 X 4 ANTENNA SWITCH

(18) CONTROL CONNECTOR
This 5 Pin DIN switches the coax input of the 1 X 4 Switch to one of the 4 coax outputs. The 1 X 4 Antenna Switch Control Connector may be connected to the 3 X 1 Controller / Switch 1 X4 Select 5 pin DIN output. (See page 7). Below is a picture that defines the function of the pins on the 5 PIN DIN.

- Select Coax Output 1
- Select Coax Output 2
- Select Coax Output 3
- Select AUX Coax Output

Din connectors shown on side to be soldered

+12 Volts DC

(19) OUTPUT COAX LEDS
These LEDs are wired to indicate which coax output is connected to the coax input.
Using one or more W2IHY 3 X 4 Controllers will greatly simplify operating amateur radio stations with multiple radios, one or more linear amplifiers and multiple antennas. The W2IHY 3 X 4 Coax Switch may be configured in many ways. The following are 9 typical configurations.

MULTIPLE RADIOS/SINGLE AMP/SINGLE TUNER/ MULTIPLE OUTPUTS

Configuration 1

This configuration connects up to 3 radios to a single linear amplifier / tuner. The tuner, via the 1 X4 Antenna Switch can be configured to be connected to up to four different outputs.

MULTIPLE RADIOS/SINGLE AMP/SINGLE TUNER/ SINGLE OUTPUT

Configuration 2

This configuration connects up to 3 radios to a single linear amplifier / tuner. The amp / tuner output(s) are connected to antennas, antenna switches or other devices.
MULTIPLE RADIOS WITH AMPS CONNECTED/
SINGLE TUNER/MULTIPLE OUTPUTS

Configuration 3

This configurations connects up to 3 radios each with a linear amplifier to a single tuner. The 1 X4 Antenna Switch can be configured to be connected to up to four different outputs.

MULTIPLE RADIOS WITH AMPLIFIERS AND TUNERS
MULTIPLE OUTPUTS

Configuration 4

This configurations connects up to 3 radios each with a linear amplifier / tuner. The 1 X4 Antenna Switch can be configured to be connected to up to four different outputs.
MULTIPLE RADIOS/MULTIPLE AMPS/SINGLE TUNER/ SINGLE OUTPUT

Configuration 5

This configuration requires one 3 X1 controllers and two
1 X4 Coax Switches. This configuration supports
connecting any one up to 3 radios to any one of 3 amplifiers.
Any of the 3 amplifiers may be configured to use a single
tuner. The selected amplifier and/ tuner may be connected to
a single antenna, antenna switches or other device. The front
panel AUX switch may not be used, in this configuration, to
connect an external antenna or dummy load to the AUX
AUX OUTPUT for use by the connected amplifiers.

MULTIPLE RADIOS/MULTIPLE AMPS/MULTIPLE TUNERS/
OUTPUTS CONNECTED TO TUNERS

Configuration 6

This configurations connects up to 3 radios to any one of 3
linear amplifiers with their own tuners. The output(s) of each
tuner is connected to an antenna, antenna switches or other
device.
MULTIPLE RADIOS/MULTIPLE AMPS/SINGLE TUNER/ MULTIPLE OUTPUTS

Configuration 7

This configuration requires two 3 X1 controllers and two 1 X4 Coax Switches. This configuration supports connecting any one up to 3 radios to any one of 3 amplifiers. Any of the 3 amplifiers may be configured to use a single tuner. The tuner may be configured to connect to any one of 4 different outputs.

MULTIPLE RADIOS/MULTIPLE AMPS/SINGLE TUNER SINGLE OUTPUT

Configuration 8

This configuration requires two 3 X1 controllers and one 1 X4 Antenna Switch. This configuration supports connecting any one up to 3 radios to any one of 3 amplifiers. Any of the 3 amplifiers may be configured to use a single tuner. The output(s) of the tuner may be connected to antennas, antenna switches or other devices.
COAX SWITCH CONFIGURATIONS

MULTIPLE RADIOS/MULTIPLE AMPS/MULTIPLE TUNERS
MULTIPLE OUTPUTS

Configuration 9

This configuration requires two 3 X1 controllers and two 1 X4 Antenna Switches. This configuration supports connecting any one up to 3 radios to any one of 3 amplifiers where each may have a tuner connected to it. The selected amplifier / tuner may be connected to any one of 4 different outputs.

MULTIPLE RADIOS/MULTIPLE AMPS/MULTIPLE TUNERS
SINGLE OUTPUT

Configuration 10

This configuration requires two 3 X1 controllers and one 1 X4 Coax Switch. This configuration supports connecting any one up to 3 radios to any one of 3 amplifiers. Each amplifier may have a tuner connected to it. The selected amplifier / tuner, using a 3 x 1 controller may be connected to a single antenna, antenna switches or other device.
Connect a 10-15 volt DC power source capable of 1 amp, to the 3X 1 Controller. This power source will provide power for the 3 x1 controller and 1 x 4 Switch. Connect a cable between the 3 X1 Controller and 1 X 4 Switch. This connection switches the coax input of the 1 X 4 Switch to one of the 4 coax outputs. Below is a picture of the cable wiring.
Coax Switch Quick Start
RF Connections

Connect your radios/RF devices as shown in the picture below. A SWR/watt meter, RF amplifier and antenna tuner may be connected to the coax input of the 3 X 1 Controller. If the 1X 4 Coax switch is to be used with the 3 X1 controller connect the appropriate length coax as shown below.
Stereo or mono audio sources, from up to three different radios, may be connected to the speaker inputs of the 3 X 1 Controller. External stereo or mono speakers may be connected to the speaker output. Connecting the above inputs and outputs is done using RCA shielded cables.

Below is a picture of the cable wiring.
Below is a diagram showing how to wire transceiver / transmitter ALC and Amplifier keying function to the 3X1 controller and from the controller to a linear amplifier. The diagram below supports configurations 1 and 2 shown on page 14 of the 3 x4 Switch Plus manual. It is very important that the ALC output connectors are wired as shown in the diagram (The 3 ALC connections are connected together with RCA cables.) It is also very important that the amp keying outputs are wired as shown in the diagram (The 3 amp keying outputs are connected together with RCA cables.) It is very important that there is a cable installed between the SWR IN and SWR Out RCA connectors. These RCA connectors are used to disable all three rear accessible, output Amp Keying RCA connectors. They may be connected to a SWR meter or antenna tuner that has circuitry to disable amplifier keying.
COAX SWITCH QUICK START
RF AND CONTROL CONNECTIONS
FOR CONFIGURATION 5

The wiring diagram below shows how to wire the “RF paths and 1 x 4 Switch control connection to support configuration 5 (Multiple radios, multiple amplifiers single antenna tuner, single output.) Connect your radios/ RF devices as shown in the diagram below.
COAX SWITCH QUICK START
ALC AND AMP. KEYING CONNECTIONS
FOR CONFIGURATION 5
COAX SWITCH QUICK START
RF AND CONTROL CONNECTIONS
FOR CONFIGURATION 6

The wiring diagram below shows how to wire the “RF paths and 1 x 4 Switch control connection to support configuration 6 (Multiple radios, multiple amplifiers multiple antenna tuners, multiple outputs.) Connect your radios/RF devices as shown in the diagram below.
COAX SWITCH QUICK START
ALC AND AMP. KEYING CONNECTIONS
FOR CONFIGURATION 6

GND

Output 1
Output 2
Output 3

TUNER
METER
ALC AMPLIFIER
AMP KEY
ALC AMPLIFIER
AMP KEY
ALC AMPLIFIER
AMP KEY

1 x 4 Switch

Output AUX
Ant or other
Ant or other
Ant or other

AMPLIFIER
AMP
ALC
ALC
ALC

RADIO A
ALC and AMP KEYING
RADIO A
ALC and AMP KEYING
RADIO A
ALC and AMP KEYING

METER
TUNER
TUNER
TUNER

-26-
Below is a diagram that shows how to wire an iPlus Audio Switch to the 3 X 1 Controller. When the 3 X 1 Controller front panel Local / Remote switch is in the remote position the iPlus may be used to connect one of up to three radios from the Input A,B,C connectors to the coax, ALC, amp keying and speaker output connectors. Please note a male RCA connector, shorting connector must be used as shown below. This connector shorts the center pin to the shell of the connector.
External devices that control linear amplifier keying may be connected to the 3 X 1 Controller to enable or disable amplifier keying. Such devices are designed to protect linear amplifiers when high SWR is detected or in the case of an auto tuner when the tuner is tuning. The pictures below show how two popular devices may be connected to the rear panel SWR IN / SWR Out RCA connectors (also see page 11). When an external device is unkeying amplifiers connected to the 3 X 1 controller the front panel Tune Switch red UNKEY AMP LED will be on (See page 4),